

REMARKS

The Drawings

The Examiner has objected to the drawings for inconsistencies, numbering, failure to mention reference signs in the description of the invention, and failure to show reference signs on the drawings that are mentioned in the description of the invention. Replacement drawings and replacement sections of the specification have been provided to correct the deficiencies noted by the Examiner. No new matter has been added as a result of the clarifications to the drawings and the specification. With respect to reference sign “29” being mentioned in the specification related to Fig. 6 but not being shown on the drawing, paragraph [0049] has been modified to remove the reference to the exchanger, instead of changing the drawing. Applicant respectfully submits that all basis for the objections related to the drawings have been corrected, which place the drawings in condition for acceptance.

The Rejections

Claims 19 – 24 were rejected under the provisions of 35 U.S.C. § 112, second paragraph as allegedly being indefinite.

Claims 1– 9, 25 – 29, 37 – 38, and 40 – 45 were rejected under the provisions of 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,244,070 issued to Lee et al (hereafter “Lee”).

Response to 35 U.S.C. §112, Second Paragraph Rejection

Claim 19 has been amended to clearly show that the described trays are located in the fractionation column, thereby removing the basis for the 35 U.S.C. § 112 rejection. Claims 20 – 24 depend upon Claim 19 and therefore incorporate the limitations of Claim 19.

Response to 35 U.S.C. §102(e) Rejection – Lee Patent

Claims 1 – 9, 25 – 29, 37 – 38, and 40 - 45 were rejected under the provisions of 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,244,070 issued to Lee et al (hereafter “Lee”). Applicant respectfully submits that differences exist between the prior art reference, Lee, and the present invention as embodied in the claims. Claims 1 and 25 have been amended to even further distinguish the present invention from the Lee process. The differences between the processes make the present invention patentably distinguishable from this prior art reference.

As a primary difference, Lee does not teach the use of a preselected differential pressure between a high pressure absorber and a fractionation column within the process as required in part (e) of claims 1 and 25. In contrast, Lee teaches a demethanizer column where the pressure is independent of the absorber pressure (col. 6, l. 7 and tables I, II, and III). The preselected differential pressure of the current invention is typically between 50 psia and 350 psia. There are significant advantages to controlling the pressure of the fractionation column based upon the pressure of the absorber. The fractionation column pressure is controlled by the overhead compressor (see p. 25, ll. 6 – 7 of application). Controlling the pressure in this manner provides significant advantages, for example, related to safety, efficiency, and economy.

The overhead compressor 120 used in Fig. 7 of Lee is typically only needed when a lean reflux stream is used. The overhead compressor compresses the lean reflux streams to an optimal pressure to allow for substantial condensation (see col. 11, ll. 26 – 40). The pressure of the demethanizer is typically operated around 352 psia (col. 6, l. 7). Operating the demethanizer in this manner limits the separation efficiency and decreases the flexibility of the processes described in Lee. The richness of the feed stream of the process varies considerably. Without being able to adjust the demethanizer operating pressure, inefficient separation and a reduction in

the product recovery is likely to result. The overhead compressor of Lee is not used to control the pressure of the fractionation column nor is there any disclosure to indicate that it could be used in this manner. Thus, Lee does not fairly teach the present invention.

Another distinction between the two processes is that the entire first vapor stream flow in the present invention is sent to the absorber, while only a portion of the first vapor stream is sent to the absorber in Lee. Claims 1 and 25 of the current application require that the absorber be supplied the entire first vapor stream. FIG. 6 of the present invention shows the first vapor stream being split prior to the expander, but the split stream 142b goes through a heat exchanger and then is fed into the absorber as well. Therefore, in all embodiments, the entire first vapor stream is sent to the absorber. In some embodiments, Lee splits the first vapor stream into three separate streams, as shown in Lee's Figure 7 and described in the abstract. Only one of the three separate streams is sent to the absorber as a feed stream. In other Lee embodiments, such as that shown in FIG. 8, the first vapor stream is not sent to the absorber at all. Lee does not disclose sending the entire first vapor stream to the absorber, as required with the current invention. As the bypassing of the absorber in Lee strongly impacts separation efficiency, sizing and design conditions, this is a substantial difference.

Another distinction between the Lee process and the current invention is that the absorber feed stream comes from different sources. In the present invention, the absorber feed stream is taken from the tower overhead stream. Claims 1 and 25 parts (f) and (g) require that the absorber feed stream be produced by condensing and compressing the tower overhead stream. This is significantly different than the source of the absorber feed stream in the Lee process. In Lee, the primary source of the absorber feed stream is either as a portion of the first vapor stream (as shown in FIGS. 6, 8, and 9) or as a portion of the residue gas stream (as shown in FIG. 7).

FIG. 7 of the Lee patent illustrates sending a portion of the tower overhead stream 58d as a reflux stream and a portion of the residue gas stream 86 as a first feed stream to the absorber 82. The two streams 58d, 86c are combined into one stream 86a. In contrast, FIG. 8 of the present invention illustrates a portion of the residue gas stream 152 being recycled back to the absorber 18 as stream 151. However, the absorber 18 still receives its feed stream 170 from the tower overhead stream 160. The streams 151 and 170 are sent separately to the absorber at different feed locations on the absorber. The source of the residue gas streams in the two processes is different. In the present invention, the residue gas stream 152 is typically produced from the absorber overhead stream 146. In the Lee patent, the residue gas stream 58b is typically produced from the tower overhead stream 58. The absorber overhead stream 90 in Lee is sent to the tower as a top feed stream 90a.

In summary, at least one of the elements of claims 1 and 25 are missing from the Lee process, such as the requirement of a preselected differential pressure between the high pressure absorber and the fractionation column, as opposed to being operated independently. Other differences exist between the two processes, which are described herein. Claims 2 – 9 depend from 1 and claims 26 – 29, 37 – 38, and 40 – 45 depend from claim 25 and therefore incorporate the same limitations. Applicant respectfully submits that Lee does not teach at least one of the elements of the present invention, such as the preselected differential pressure between the high pressure absorber and the fractionation column. There is at least one element missing from the Lee patent that is required in the present invention. As such, the Lee Patent does not anticipate the present invention and thus should not be a bar to the patentability of the present invention.

The Objections

Claims 10 – 18 and 30 – 36 were objected to as being dependent upon a rejected base claim. Applicant respectfully submits that the base Claims 1 and 25 are now patentably distinguishable from the prior art reference. Claims 10 – 18 and 30 – 36 depend from Claims 1 and 25 respectfully and incorporate the limitations thereof.

Summary

The current claims contain elements not found in the prior art, making the presently claimed invention patentably distinguishable from the disclosure of the cited references. The operation of the processes with respect to the predetermined differential pressure between the absorber and the fractionation column and the disposition of various flow streams with the processes are very different, which are important to the performance of the instant invention. Other differences exist such as the source of the residue gas streams and the uses of the overhead compressor on the fractionation column overhead stream.

In commenting upon the references and in order to facilitate a better understanding of the differences that are expressed in the claims, certain details of distinction between the references and the present invention have been mentioned, even though such differences do not appear in all of the claims. It is not intended by mentioning any such unclaimed distinctions to create any implied limitations in the claims. Not all of the distinctions between the prior art and Applicant's present invention have been made by Applicant. For the foregoing reasons, Applicant reserves the right to submit additional evidence showing the distinctions between Applicant's invention to be unobvious in view of the prior art.

The foregoing remarks are intended to assist the Examiner in re-examining the application and in the course of explanation may employ shortened or more specific or variant descriptions of some of the claim language. Such descriptions are not intended to limit the scope

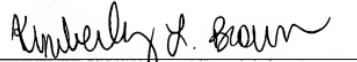
of the claims; the actual claim language should be considered in each case. Furthermore, the remarks are not to be considered to be exhaustive of the facets of the invention which render it patentable, being only examples of certain advantageous features and differences which Applicant's attorney chooses to mention at this time.

Reconsideration of the application and allowance of all of the claims are respectfully requested.

In view of the foregoing Amendment, Applicant respectfully submits that all of the claims are allowable, and Applicant respectfully requests the issuance of a Notice of Allowance.

Respectfully submitted,

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